

IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Randy L. Hoffman

Confirmation No.:

Application No.:

Examiner:

Filing Date: Herewith

Group Art Unit:

Title: SEMICONDUCTOR DEVICE

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

This Information Disclosure Statement is submitted:

- ☒ under 37 CFR 1.97(b), or  
(Within three months of filing national application; or date of entry of national application; or before mailing date of first office action on the merits; whichever occurs last)
- ☐ under 37 CFR 1.97(c) together with either a:  
☐ Statement under 37 CFR 1.97(e), or  
☐ a \$180.00 fee under 37 CFR 1.17(p), or  
(After the CFR 1.97 (b) time period, but before final action or notice of allowance, whichever occurs first)
- ☐ under 37 CFR 1.97 (d) together with a:  
☐ Statement under 37 CFR 1.97(e)(1) or (2), and  
☐ a \$180.00 fee set forth in 37 CFR 1.17(p).  
(Filed after final action, a notice of allowance, on or before payment of the issue fee)

Please charge to Deposit Account **08-2025** the sum of \$0.00 . At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **08-2025** pursuant to 37 CFR 1.25.

☒ Applicant(s) submit herewith Form PTO 1449 - Information Disclosure Statement together with any required copies of patents, publications or other information of which applicant(s) are aware, which applicant(s) believe(s) may be material to the examination of this application and for which there may be a duty to disclose in accordance with 37 CFR 1.56.

☐ A concise explanation of the relevance of foreign language patents, foreign language publications and other foreign language information listed on PTO Form 1449, as presently understood by the individual(s) designated in 37 CFR 1.56 (c) most knowledgeable about the content is given on the attached sheet, or where a foreign language patent is cited in a search report or other action by a foreign patent office in a counterpart foreign application, an English language version of the search report or action which indicates the degree of relevance found by the foreign office is listed on form PTO 1449 and is enclosed herewith.

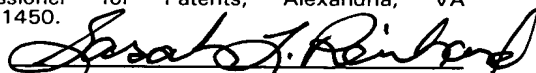
It is requested that the information disclosed herein be made of record in this application.

"Express Mail" label no. EV372029259US

Date of Deposit 03/12/2004

I hereby certify that this is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, Alexandria, VA 22313-1450.

By

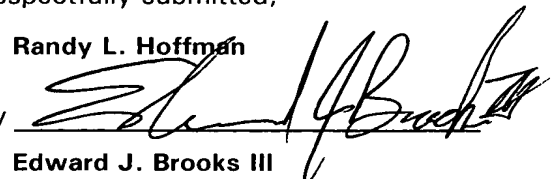


Typed Name: Sarah L. Reinhard

Respectfully submitted,

Randy L. Hoffman

By



Edward J. Brooks III

Attorney/Agent for Applicant(s)  
Reg. No. 40,925

Date: 03/12/2004

<b>FORM PTO-1449</b>  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	ATTY. DOCKET NO.	APPLICATION NO.	CONFIRMATION NO.
	<b>200315134-1</b>		
	APPLICANT		
	<b>Randy L. Hoffman</b>		
	FILING DATE	GROUP	
	<b>Herewith</b>		

## REFERENCE DESIGNATION

## U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	PUBLICATION DATE	NAME	Pages, Columns, Lines Where Relevant Passages or Figures Appear
	1A	4,559,238	12/17/1985	Bujatti, et al.	
	1B	5,107,314	04/21/1992	Kahng, et al.	
	1C	5,744,864	08/28/1998	Cillessen, et al.	
	1D	2003/0047785	02/13/2003	Kawasaki, et al.	
	1E	2003/0104659	06/05/2003	Arakawak, et al.	
	1F	2003/0111663	06/19/2003	Yagi	
	1G	2003/0139026	07/24/2003	Lucovsky	
	1H	2003/0180996	09/25/2003	Yamazaki, et al.	
	1I	2003/0186489	10/02/2003	Ishikawa	
	1J	2003/18221	11/27/2003	Wager, III, et al.	
	1K	2003/18222	11/27/2003	Wager, III, et al.	

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	PUBLICATION DATE	NAME OF PATENTEE OR APPLICANT	Pages/Columns/Lines Where Relevant Passages/Figures Appear	Check if Translation attached
	1L	WO 97-06544	02/20/1997	Cillessen, et al.		
	1M	EP1134811	09/19/2001	Kawasaki, et al.		
	1N					
	1O					
	1P					

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, etc.)

	1Q	Aoki, Akira, et al., "Tin Oxide Thin Film Transistors", Japan J. Appl. Phys., Vol. 9, p.582 (1970).
	1R	Carcia, P.F., et al., "Transparent ZnO thin-film transistor fabricated by rf magnetron sputtering", Applied Physics Letters, Vol. 82, No. 7, pp. 1117-1119 (February 17, 2003).
	1S	Carcia, P.F., et al., "ZnO Thin Film Transistors for Flexible Electronics", Mat. Res. Soc. Symp. Proc., Vol. 769, pp. H72.1-H72.6 (2003).

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	2A	2003/0224550	12/04/2003	Kokubo, et al.	
	2B	60/490,239	07/25/2003		Transparent Thin Film Transistor with Zinc-Tin Oxide Channel...
	2C	10/763,239	01/23/2004		Semiconductor Device
	2D	10/763,354	01/23/2004		Transistor Including a Deposited Channel Region Having a ...
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	2L					
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## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, etc.)

	2Q	Fu, Shelton, et al., "MOS and MOSFET with Transistion Metal Oxides", SPIE Vol. 2697, pp. 520-527.
	2R	Giesbers, J.B., et al., "Dry Etching of All-Oxide Transparent Thin Film Memory Transistors", Microeletronic Engineering, Vol. 35, pp. 71-74 (1997).
	2S	Grosse-Holz, K.O., et al. "Semiconductive Behavior of Sb Doped SnO2 Thin Films", Mat. Res. Soc. Symp. Proc., Vol. 401, pp. 67-72 (1996).

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## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, etc.)

	3Q	Hajnal, Zoltán, et al., "Role of oxygen vacancy defect states in the N-type conduction of B-Ga <sub>2</sub> O <sub>3</sub> ", Journal of Applied Physics, Vol. 86, No. 7, pp. 3792-3796 (October 1, 1999).
	3R	Hajnal, Z., et al., "Theoretical Investigation of the Oxygen Vacancies in B-Ga <sub>2</sub> O <sub>3</sub> ", Rapid Research Notes, Phys. Stat. Sol. (a), Vol. 171, No. R5 (1999).
	3S	Hoffman, R.L., et al., "ZnO-based transparent thin-film transistors", Applied Physics Letters, Vol. 82, No. 5, pp. 733-735 (February 3, 2003).

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4Q	Masuda, Satoshi, et al., "Transparent thin film transistors using ZnO as an active channel layer and their electrical properties", Journal of Applied Physics, Vol. 93, No. 3, pp. 1624-1630 (February 1, 2003).
4R	Nakano, Yoshitaka, et al. "Electrical properties of thermally oxidized p-GaN metal-oxide-semiconductor diodes", Applied Physics Letters, Vol. 82, No. 15, pp. 2443-2445 (April, 14, 2003).
4S	Nishi, Junya, et al., "High Mobility Thin Film Transistors with Transparent ZnO Channels", Jpn. J. Appl. Phys., Vol. 42, Part 2, No. 4A, pp. L347-L349 (April, 2003).

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5Q	Ohya, Yutaka, et al., "Thin Film Transistor of ZnO Fabricated by Chemical Solution Deposition", Jpn. J. Appl. Phys., Vol. 40, Part 1, No. 1, pp. 297-298 (January, 2001).
5R	Orita, Masahiro, et al., "Deep-ultraviolet transparent conductive B-Ga2O3 thin films", Applied Physics Letters, Vol. 77, No. 25, pp. 4166-4168 (December 18, 2002).
5S	Oritia, Masahiro, et al., "Preparation of highly conductive, deep ultraviolet transparent B-Ga2O3 thin film at low deposition temperatures", Thin Solid Films, Vol. 411, pp. 134-139 (2002).

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	6Q	Pallecchi, Ilaria, et al. "SrTiO <sub>3</sub> -based metal-insulator-semiconductor heterostructures" Applied Physics Letters, Vol. 78, No. 15, pp. 2244-2246 (April 9, 2001).
	6R	Prins, M. W. J., et al., "A ferroelectric transparent thin-film transistor", Applied Physics. Letters, Vol. 68, No. 25, pp. 3650-3652 (June 17, 1996).
	6S	Seager, C.H., et al., "Charge Trapping and device behavior in ferroelectric memories", Appl. Phys. Lett., Vol. 68, No. 19, pp. 2660-2662 (May 6, 1996).

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	7Q	Ueda, Naoyuki, et al. "Anistrophy of electrical optical properties in B0Ga2O3 single crystals", Appl. Phys. Lett., Vol. 71, No. 7, pp. 933-935 (August 18, 1997).
	7R	Ueda, Naoyuki, et al., "Systhesis and control of conductivity of ultraviolet transmitting B-Ga2O3 single crystals", Appl. Phys. Lett., Vol. 70, No. 21, pp. 3561-3563 (June 30, 1997).
	7S	Uneno, K., et al. "Field-effect transistor on SrTiO3 with sputtered Al2O3 gate insulator", Applied Physics Letter, Vol. 83, No. 9, pp. 1755-1757 (September 1, 2003).

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## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, etc.)

8Q	Ví lora, E.G., et al., "Infared Reflectance and Electrical Conductivity of B-Ga2O3", Phys. Stat. Sol. (a), Vo. 193, No. 1, pp. 187-195 (2002).
8R	Wöllenstein, Jürgen, et al., "An insulated gate thin-film transistor using SnO2 as semiconducting channel, a possible new gas sensor device" The 11th European Conference on Solid State Transducers, pp. 471-474 (September 21-24, 1997).
8S	Yoshida, A., "Three Terminal Field Effect Superconducting Device Using SrTiO3 Channel" IEEE Transactions on Applied Superconductivity, Vol. 5, No. 2, pp. 2892-2895 (June, 1995).

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2003151341-1

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	9Q	Solid-State Electronics, Vol. 7, Pergamon Press, Notes pp. 701-702 (1964).
	9R	Anonymous, "Transparent and/or memory thin film transistors in LCD's and PLEAD_" Research Disclosure, p. 890 (July 1998).
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